

THE ELUCIDATOR

Office of Surety, Safety and Environment (SSE)
U.S. Army Medical Research Materiel Command
MCMR-ZC-SSE
504 Scott Street
Fort Detrick, MD 21702-5012
301-619-0225

Visit us at:

<http://mrmc-www.army.mil>



UNITED STATES ARMY MEDICAL RESEARCH
AND MATERIEL COMMAND

Office of Surety, Safety and Environment (SSE)

October 2008
Newsletter



THE SSE ELUCIDATOR

“Elucidate: to give clarity through explanation and analysis.”

LACK OF SLEEP AFFECTS HEALTH



Want to lower your risk of heart disease, cancer, obesity, and depression? Go to bed. It's not absolutely clear that sleep loss leads to bad health but evidence is mounting. Decreased sleep is now associated with dozens of different illnesses and health problems. We live in a chronically overtired society. In this country, half of us aren't getting the seven to eight hours of sleep we need -- and our health may be suffering for it. Getting enough sleep should be considered just as important as eating a healthy diet and exercising.

While scientists still don't know exactly why we need sleep, we know with certainty that we do need it. A natural cycle of rest and wakefulness dictates all sorts of biological functions. In other words, start messing with the sleep cycle, and lots of things -- metabolism, hormone levels, and blood pressure -- go out of whack. Sleep loss has been associated with:

Heart disease – Not getting enough sleep may trigger the release of stress hormones and proteins that bump up the risk of heart attacks and strokes. One

INSIDE THIS ISSUE

Lack of Sleep Affects Health	1
12 Tips to Boost Happiness and Productivity at Work	3
EPA's Upcoming Events	3
Top 10 Emerging Environmental Technologies	4
Reconnecting Children with Nature	6
October's Careless Calamities	7

large study published in the Archives of Internal Medicine in 2003 showed that women who slept less than five hours a night were 45% more likely to have heart problems than women who slept eight hours.

Diabetes – Being sleep-deprived can affect how your body processes blood sugar, and that could raise your risk of diabetes. One 1999 Lancet study of 11 healthy, young men found that after just six days of sleeping for four hours a night, their insulin and blood sugar levels were similar to those of people on the verge of diabetes.

Cancer – Sleeping too little has been linked with an increased risk of breast and colon cancer. Why? Exposure to light at night can decrease levels of the hormone melatonin, which may protect against cancer. Last year, the World Health Organization determined that nightshift work, which can lead to sleep troubles, is a probable human carcinogen.

Obesity – Multiple studies show that chronic loss of sleep may increase the risk of obesity. One 2004 study showed that people who sleep five hours a night are 73% more likely to become obese than those who sleep seven to nine hours. Sleep loss may cause the hormones that control appetite to get out of balance.

Reminder

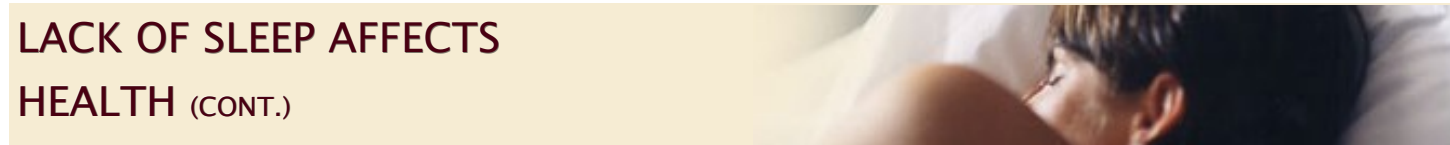
*For all accidents, no matter how minor,
specific forms documenting the incident must be submitted to your Safety Office.*

Military: DA Form 285-AB-4

Civilian: DOL Claims Forms CA-1 or CA-2

All employees requiring medical attention must visit your local Occupation Health Clinic as soon as possible post mishap.

LACK OF SLEEP AFFECTS
HEALTH (CONT.)



Depression – Depression and sleep are closely linked: While depression can cause sleep loss, sleep loss can lead to depression. Some researchers believe a cause of postpartum depression is sleep deprivation.

Infection – Recent studies show that being well rested improves the body's ability to fight off infection. One 2002 JAMA study showed that men who were vaccinated for the flu after sleeping only four hours a night for six nights had less than half the flu-fighting antibodies of men who slept normally.

Accidents – You might not consider accidents a health risk. But there's no denying a car crash can have a severe impact on your health. Lack of sleep may be the culprit in up to 20% of all serious auto accidents. And several high-profile disasters -- such as Chernobyl and the Exxon Valdez oil spill -- were caused, in part, by overtired workers.

Good Sleep Advice The list of health problems above may be scary, but don't let it keep you up at night. The health effects of sleeplessness seem to develop over a long time. The key is to make sleep more of a priority now. Try following these steps for a better night's sleep:

- ◆ Go to bed at the same time nightly — even on weekends. Creating this routine can help condition your mind and body to expect sleep at a regular time.
- ◆ Set aside enough time to hit that golden 7 hours of sleep.
- ◆ Refrain from caffeine, heavy or spicy foods, and alcohol and other optional medications that might keep you awake, four to six hours before bed-time.
- ◆ Try a light high-carb snack, such as a plain bagel. It might help you relax.
- ◆ Have a pre-sleep routine so you wind down before you hop in. About a half hour before going to bed, enjoy a low-key activity such as reading

or listening to music. To reduce muscular tension, try techniques such as meditation, progressive relaxation, or even taking a warm bath.

- ◆ Once in bed, try to stop worrying. Avoid solving your problems from your bed. Before going to bed, make a list of problems and “next steps” for the following day.
- ◆ Block out distracting lights and noises.
- ◆ Only engage in sleep and sex in bed (no TV-watching, reading or eating).
- ◆ Exercise regularly but not right before bed.

Multiple, shorter sleep sessions nightly, rather than one long one, are also an option. So-called polyphasic sleep is seen in babies, the elderly and other animals (Thomas Edison reportedly slept this way). However, it is more realistic and healthy to sleep at night as best we can and then take naps as needed.

Feel a lack of sleep doesn't affect you that much? Don't trust yourself. People who are chronically overtired often don't realize it -- they've just gotten used to feeling that way. If you suspect you might have a sleep disorder -- such as chronic insomnia or sleep apnea -- you may require treatment, such as medications or a breathing machine. Talk to your doctor about ways to improve your behavior.

Of course, getting enough sleep isn't always easy. Part of the problem is that, as a culture, we don't have much respect for sleep. While your co-workers will compliment you if you lose 10 pounds or run a marathon, they're generally unimpressed by tales of extreme napping. Unfortunately, going without sleep is still a badge of courage. Experts say it's time to change that. So take a stand for better health and forget the early bird. Maybe we could learn something from the sloth?

Check out www.sleepfoundation.org or www.shuteye.com for more tips and information on how to obtain a good night's sleep.

THE SSE ELUCIDATOR'S MONTHLY CARELESS CALAMITIES

Welcome to the latest edition of *Careless Calamities*, more tales of risk mismanagement, both the on-duty and off-duty varieties and both with similar "Wish I could have a do-over" results.

1. An AT1 from a helicopter squadron was out on the links one day. "Specific activity: Playing golf," the mishap report said. The report goes on to explain that he was "riding in the back of a golf cart when it went over a steep embankment." He, in turn, went flying off when the cart collided with a tree. There's a difference between playing a round in a golf cart, and playing around in a golf cart. Racing golf carts over blind hills with someone riding in the back is definitely the latter.

2. How many gas turbine systems technicians does it take to change a light bulb? One. Unless the bulb, which in this case is in a generator module on a gas turbine, breaks while the GSM, in this case a third class, is changing it, and he tries to remove the remaining pieces using a pair of lock-wire pliers, and he doesn't put on the required electrically safe rubber gloves, and he doesn't kill power to the outlet first, and he joins the legion of the brrrrzzzaapppp. Then the light bulb doesn't get changed at all, because the GSM is otherwise occupied in medical.

3. One summer night in Japan, the crew of a patrol craft finished prowling around an ammunition-storage cove and headed back to base. Not sure why there were in a hurry, but they were clipping right along. Not sure why they were lights out, either. Both were contrary to procedures, and the main reason for that took the form of an LCM-8 boat returning to base from orientation training. Hardware note: The LCM-8 (Landing Craft Mechanized, Type 8) is a 135,000-pound amphibious transport that "enables cargo to be transported across bodies of water." Or, in this case, directly up onto the side of a patrol craft, where it can crush the patrol craft's cabin. \$80K in damage to equipment. Two Sailors on the patrol craft were cut by flying glass and smashed against equipment in the cabin. Those two, an MA3 and an MA2, lost a total of three days of work and spent a total of nine

days on light duty. A dozen trainees (plus the four-man crew) were aboard the LCM. All were uninjured, and all received excellent training regarding why you go slow at night and keep your lights on.

4. Latest iteration of the Not-O.K.-Corral was aboard a ship in Hawaii, which just goes to show that Tombstone and the tropics aren't all that far apart. Seems that a CTTSN, during topside rover watch, noticed the ejection port cover on his M-16 was open. This meant that the condition of the weapon had changed from Condition 3 to Condition 1. In other words, a round had been chambered. Keep in mind that the rifle remained in the seaman's tactical sling during the following fiasco. A GM2 decided to help clear the M-16 and return it to Condition 3. He "took control of the weapon," something that I'd call debatable given the aforementioned sling, and removed the magazine. The report refers to this as using "tactical" procedures, which apparently don't involved the use of a clearing barrel or even following the ordinary rules. The GM2 tried to lock the bolt in the rear position with the weapon on safe. The seaman then tried to reinsert the magazine, but it wouldn't seat. Then the GM2 tried to reinsert the magazine. Who had control at this point is unclear. I guess the GM2, because he pulled the charging handle back with his finger in the trigger guard and discovered it wasn't on safe anymore thanks to inadvertently pulling the trigger and discharging a 5.56 mm round into the deck. Kerblammo! Shrapnel hit the GM2 in his leg and cheek and the right side of his body. It also hit the seaman in the leg. They were treated at sick bay, then taken to the nearest medical center. One week of light duty for the GM2, one day lost for the seaman. Note to all weapons handlers who are about to engage in a combination arm-wrestling match and battle of wits with a loaded weapon. Please look up the word "tactical" and see if the definition says, "Don't worry about the clearing barrel, it's only for amateurs."

RECONNECTING CHILDREN WITH NATURE



A national movement to reconnect children with nature has developed over the last few years in response to the bestselling book by Richard Louv, *Last Child in the Woods: Saving Our Children from Nature Deficit Disorder*. *Last Child in the Woods* is the first book to bring together a new and growing body of research indicating that direct exposure to nature is essential for healthy childhood development and for the physical and emotional health of children and adults. According to the National Wildlife Federation, children who spend unstructured time outdoors on a daily basis benefit in the following ways:

- ◆ Maintain lower stress levels
- ◆ Develop more active imaginations
- ◆ Become physically fit
- ◆ Benefit from stronger immune systems
- ◆ Experience fewer symptoms of ADD and ADHD

Louv has labeled the malady of children who suffer from a lack of connection to the natural world as nature deficit disorder. No doubt about it -- today's children are born into, and are growing up in, a fast paced wired world. A recent study found that children today spend an average of 6 hours each day in front of the computer and TV but less than 4 minutes a day in unstructured outdoor play. Even scarier, the rapid increase in childhood obesity leads many health-care leaders to worry that the current generation of children may be the first since World War II to die at an earlier age than their parents.

Time away from the hectic schedules of modern life renew our delight and wonder for the world around us. The healing quiet and green of nature do have the ability to reset our inner clock and give us a sense of inner balance and calm. It may have something to do with what Harvard professor E. O. Wilson calls the biophilia hypothesis, which is that human beings are innately attracted to nature: biologically, we are all still hunters and gatherers, and there is something in us, which we do not fully understand, that needs an

occasional immersion in nature. Getting kids outdoors more, riding bikes, running, swimming—and, especially, experiencing nature directly—could serve as an antidote to much of what ails the young.

In response to the research that suggests our children are at risk of losing touch with the important health benefits of playing outside in nature, individuals and organizations involved in directing children's health and well-being have formed alliances locally, regionally, and nationally to assure that children in every community have opportunities to experience nature directly. The Children & Nature Network (C&NN) was created to encourage and support people and organizations working to reconnect children with nature. The network provides a critical link between researchers and individuals, educators and organizations dedicated to children's health and wellbeing. Parents, Civic leaders, educators and health-care providers can visit www.childrenandnature.org for access to the latest news and research in this field as well as practical advice, including ways to apply new-found knowledge at home, at school, in work environments, and in the community.

There are many practical solutions and simple ways to heal the broken bond – and many are right in our own backyard. Here are a couple of fun ideas:

Oldie but Goodies – Everyone has a favorite playground or backyard game they loved growing up. Why not get outside and introduce the kids to Red Light Green Light, Kick the Can, or Flashlight Hide and Seek.

Track and Field Day – Invite neighborhood kids to compete in events like relay races, sprints and long jumps. Be sure to race on grass to avoid injuries.

Scavenger Hunt – Create a list of ten things that can be found outside with a little bit of concentration, such as specific leaves, feathers or pine cones. The first child to return with all ten things wins.

Outdoor Free Play – Get kids off the playground and into nature and just let their imaginations do the rest. Unstructured, spontaneous play, especially outdoors in nature is not only beneficial for their health, it also is sometimes the most fun.

12 TIPS TO BOOST HAPPINESS AND PRODUCTIVITY AT WORK

Of course, being happy at work depends mostly on how much you like your job. But there are smaller steps that can boost your happiness as well. Some of these steps are VERY small, but taking steps to improve your situation itself boosts happiness.


1. Check for eyestrain by putting your hand to your forehead in a salute. If your eyes feel relieved, your work space is too bright.
2. Sit up straight with your shoulders down -- every time you adjust your sitting position, you should instantly feel more energetic and cheerier.
3. Get a phone headset. Many resist a phone headset because it looks so preposterous, but it's really much more comfortable. Also, it lets you pace while you talk on the phone, which is energizing.
4. Don't keep candy on your desk. Studies show that people are much more likely to snack when a treat is within easy reach, and a handful of M&Ms each day could mean a weight gain of five pounds a year.
5. Never say "yes" on the phone; instead, say, "I'll get back to you." When you're actually speaking to someone, the desire to be accommodating is very strong, and can lead you to say "yes" without enough consideration. Along the same lines...
6. When deciding whether to say "yes," imagine that you're accepting a job that you'll have to do next week. Don't agree to something just because it seems so far off that it doesn't seem onerous.
7. Don't let yourself get too hungry. Eat healthy snacks and meals at the same time each day. If you don't have enough food in you, your energy levels will drop off making you less able to cope with the stress and tasks you encounter.
8. Take care of difficult calls, tasks, or emails as quickly as possible, giving a big boost of relieved energy. Procrastinating makes them harder.
9. If you're feeling overwhelmed, think hard about how you spend your time. Be honest. How much time

do you spend surfing the internet, looking for things you've misplaced, or doing a task that's really someone else's job? Also...

10. Although some people believe it's best to keep work life and personal life separate, and therefore avoid making friends with colleagues, for most people, having strong friendships makes work more fun. Science supports this: having close relationships is essential to happiness, strengthens the immune system, and reduces anxiety.

11. Go outside at least once a day, and if possible, take a walk. The sunlight and activity is good for your focus, mood, and retention of information.

12. Say "Good morning" to everyone. Social contact is cheering, and if you feel that you're on good terms with all the people in your office, you'll be happier each day. Also, it's polite.







EPA'S UPCOMING EVENTS

October Children's Health Month – EPA is launching the Climate Change and Children's Health Education Campaign, to encourage students to take actions to address global climate change and children's health. <http://yosemite.epa.gov/ochp/ochpweb.nsf/content/chm07.htm>

Week 19 – 25 Poison Prevention Week – What you can do to protect children from pesticides and household chemicals. <http://www.epa.gov/opp00001/healthpoisonprevention.htm>

Day 18 World Water Monitoring Day – Conduct simple monitoring tests and learn about common indicators of water health. Find out more about citizen monitoring efforts. http://yosemite.epa.gov/opa/admpressnsf/names/hq_2008-9-18_WATER_MONITORING



TOP EMERGING ENVIRONMENTAL TECHNOLOGIES

Overuse of resources, water supply shortages, global climate change, and deforestation are just some of the issues experts say need to be addressed for humans to achieve sustainable living on this planet. By the year 2025, an additional 2.9 billion people will strain tightening water supplies, and the world's energy needs will go up 60 percent by 2030, according to the United Nations. Here are some technologies that hold promise for our future.

Make Paper Obsolete – Electronic paper, a flexible display that looks very much like real paper but can be reused over and over. Thirty-five years in the making, electronic paper is now closer than ever to changing the way we read, write, and study. Made of flexible material, requiring ultra-low power consumption, cheap to manufacture, and—most important—easy and convenient to read, e-papers of the future are just around the corner, with the promise to hold libraries on a chip and replace most printed newspapers before the end of the next decade. Check out <http://thefutureofthings.com/articles/1000/the-future-of-electronic-paper.html> for more information.

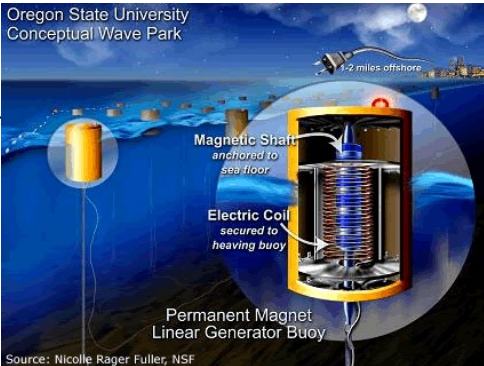
Let Plants and Microbes Clean Up After Us – Bioremediation uses microbes and plants to clean up contamination. Examples include the cleanup of nitrates in contaminated water with the help of microbes, and using plants to uptake arsenic from contaminated soil, in a process known as phytoremediation. The U.S. EPA has used it to clean up several sites. Often, native plant species can be used for site cleanup, which are advantageous because in most cases they don't require pesticides or watering. In other cases scientists are trying to genetically modify the plants to take up contaminants in their roots and transport it all the way to the leaves for easy harvesting. Visit <http://www.epa.gov/nrmrl/lrpcd/rr/phytores.htm> for research and development information.

Plant Your Roof – It's a wonder that this concept attributed to the Hanging Gardens of Babylon, one of

Seven Wonders of the World, didn't catch on sooner in the modern world. Roof gardens help absorb heat, reduce the carbon dioxide impact by taking up CO₂ and giving off oxygen, absorb storm water, and reduce summer air conditioning usage. Ultimately, the technique could lessen the "heat island" effect that occurs in urban centers. Butterflies and songbirds could also start frequenting urban garden roofs, and like the king's wife, could even cheer up the inhabitants of the building.

Harness Waves and Tides – The oceans cover more than 70 percent of the Earth's surface. Waves contain an abundance of energy that could be directed to turbines, which can then turn this mechanical power into electrical. The obstacle to using this energy source has been the difficulty in harnessing it. Sometimes the waves are too small to generate sufficient power. The trick is to be able to store the energy when enough mechanical power is generated. New York City's East River is now in the process of becoming the test bed for six tide-powered turbines, and Portugal's reliance on waves in a new project is expected to produce enough power for more than 1,500 homes. Here, a buoy system capable of capturing the oceans power in the form of offshore swells is illustrated by researchers at Oregon State University.

Ocean Thermal Energy Conversion (OTEC) – The biggest solar collector on Earth is our ocean mass. According to the U.S. Department of Energy (DOE), the oceans absorb enough heat from the sun to equal the thermal energy contained in 250 billion barrels of oil each day. The U.S. consumes about 7.5 billion barrels a year. OTEC technologies convert the thermal energy contained in the oceans and turn it into electricity by using the temperature difference between the wa-



TOP EMERGING ENVIRONMENTAL TECHNOLOGIES (CONT.)

operate turbines that can drive generators. The major shortcoming of this technology is that it's still not efficient enough to be used as a major mechanism for generating power. Visit <http://www.nrel.gov/otec/what.html> for more info.

Sunny New Ideas – The sun's energy, which hits Earth in the form of photons, can be converted into electricity or heat. Solar collectors come in many different forms and are already used successfully by energy companies and individual homeowners. The two widely known types of solar collectors are solar cells and solar thermal collectors. But researchers are pushing the limits to more efficiently convert this energy by concentrating solar power by using mirrors and parabolic dishes. Part of the challenge for employing solar power involves motivation and incentives from governments. In January, the state of California approved a comprehensive program that provides incentives toward solar development. Arizona, on the other hand, has ample sunshine but has not made solar energy a priority. In fact in some planned communities it is downright discouraged by strict rules of aesthetics. DOE's solar energy page can be found at <http://www.energy.gov/energy-sources/solar.htm>.

The 'H' Power – Hydrogen fuel cell usage has been touted as a pollution-free alternative to using fossil fuels. They make water by combining hydrogen and oxygen. In the process, they generate electricity. The problem with fuel cells is obtaining the hydrogen. Molecules such as water and alcohol have to be processed to extract hydrogen to feed into a fuel

cell. Some of these processes require the using other energy sources, which then defeat the advantages of this "clean" fuel. Most recently, scientists have come up with ways to power laptops and small devices with fuel cells, and some car companies are promising that soon we'll be seeing cars that emit nothing but clean water.

Remove the Salt – According to the UN, water supply shortages will affect billions of people by the middle of this century. Desalination, basically removing the salt and minerals out of seawater, is one way to provide potable water in parts of the world where supplies are limited. Today's state-of-the-art technology uses thin film composite membranes in place of the older cellulose acetate and polyamide membranes. The composite membranes work over a wider range of pH, at higher temperatures, and within broader chemical limits, enabling them to withstand more operational abuse. This technology is expensive and uses a lot of energy, however scientists are working toward better energy recovery methodologies that will make better use of the energy inputs to the systems.

Make Oil from Just about Anything – Any carbon-based waste, from turkey guts to used tires, can, by adding sufficient heat and pressure, be turned into oil through a process called thermodepolymerization. This is very similar to how nature produces oil, but with the process expedited by millions of years to achieve the same byproduct. Proponents of this technology claim that a ton of turkey waste can cough up about 600 pounds of petroleum. The implications, of course, are huge. The agricultural waste generated by the U.S. each year—roughly four billion tons—could theoretically yield the same amount of oil our country imports from the Middle East. Skeptical? Check out these two articles on the subject: http://www3.interscience.wiley.com/8100/legacy/college/boyer/0471_661791/cutting_edge/thermo_depolymerization/thermo_depolymerization.htm and http://news.nationalgeographic.com/news/2003/11/1125_031125_turkeyoil.html.